

# MECHANICAL ENGINEERING DEPARTMENT STUDENT GUIDE

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<http://www.nps.navy.mil/me>

This package is offered as a guide during your studies at the Mechanical Engineering Department. It is applicable to a standard 8-quarter 570 curriculum 54 P-code student. All other students consult with the Program Officer or Academic Associate. For questions please see the following:

CDR Stan Cunningham, Program Officer (x2033)

Prof. Fotis A. Papoulias, Academic Associate (x3381)

Prof. Young W. Kwon, Chairman (x3385)

Prof. Knox T. Millsaps, Associate Chairman (x3382)

## Acronyms:

ABET .....	Accreditation Board for Engineering and Technology
BS .....	Bachelor of Science
BSME .....	Bachelor of Science in Mechanical Engineering
ME .....	Mechanical Engineering
MS .....	Master of Science
MSES .....	Master of Science in Engineering Science
MSME .....	Master of Science in Mechanical Engineering
MTS .....	Materials Science
TSSE .....	Total Ship Systems Engineering

# MECHANICAL ENGINEERING DEPARTMENT STUDENT GUIDE

## Contents

1	Welcome Aboard .....	3
1.1	Message from the Chairman .....	3
1.2	Message from the Program Officer.....	3
2	Roadmap .....	5
3	Objectives .....	6
4	Degree Requirements.....	7
4.1	MS in Mechanical Engineering .....	7
4.2	MS in Engineering Science.....	7
4.3	MS in Materials Science .....	7
4.4	Mechanical Engineer .....	7
4.5	Total Ship Systems Engineering Program .....	7
5	What to Do and When.....	8
5.1	Transcript Evaluation.....	8
5.2	Matrix.....	8
5.3	BSME Equivalency Form .....	8
5.4	MSME Checklist.....	8
5.5	Thesis Approval Form .....	8
5.6	Graduating Student Exit Survey .....	8
5.7	Feedback .....	8
6	Thesis .....	9
6.1	Overview .....	9
6.2	Common Questions and Answers about the Thesis.....	11
7	For More Information .....	13
8	Appendices.....	14
8.1	Transcript Evaluation.....	15
8.2	Typical Course Scheduling .....	17
8.3	Sample Matrices.....	19
8.4	BSME Equivalency Form and Sample .....	26
8.5	MSME Checklist and Sample .....	43
8.6	Thesis Approval Form .....	54
8.7	Graduating Student Exit Survey .....	56

# **1 Welcome Aboard**

## **1.1 Message from the Chairman**

Welcome to the Department of Mechanical Engineering of Naval Postgraduate School! We are part of the Graduate School of Engineering and Applied Sciences (GSEAS). This booklet provides you with some guidelines and sample administrative forms to assist while you pursue your graduate degrees within the department. There are some milestones and the timetables that you should closely observe as you progress through your degree programs. Sample course matrices are also included for your reference. Your actual matrix may vary depending on your academic background and the actual degree you pursue. Please feel free to consult the Academic Associate and the Program Officer for further assistance. We are here to support you.

Additionally, you are required to fill out and submit the enclosed forms in accordance with the prescribed schedule. It is required that all students who are seeking the MSME degree complete both the BSME Equivalency Checklist and the MSME Checklist. Equally important is your completion of the thesis process, from selection of topics and advisor(s) to the thesis presentation. I believe the completion of your thesis is the ultimate learning experience while you study here at NPS.

Finally, I'd like to again welcome you and your family to Monterey. I wish you a memorable and enjoyable experience at NPS. Wherever you go from here, please keep in contact with us so that we may hear from you and share in your successes. Bon Voyage in your academic journey!

Young Kwon  
Chair of ME Dept.

## **1.2 Message from the Program Officer**

Welcome to Naval Postgraduate School. On behalf of the Graduate School of Engineering and Applied Sciences (GSEAS) and the entire Mechanical Engineering Department, I would like to take this opportunity to congratulate each and every one of you on your acceptance and arrival at NPS. I hope and pray that this will be both an enjoyable and educationally fruitful tour of duty. You are encouraged to seek out a balance of everything that being here has to offer. Stay focused on obtaining your advanced degree and being successful in that regard. Also remember that you need a welcome break from your work. Experience Central California and the Monterey Peninsula with family and friends whenever time will allow.

We have put together this ME Department Student Guide with your academic needs in mind. Inside you will find timelines and forms that will ensure that you successfully complete some of our necessary administrative requirements. Feel free to consult with the Academic Associate and me for additional guidance as you prepare these forms for submission. Certification of your degree completion and maintaining an accurate record

## MECHANICAL ENGINEERING DEPARTMENT STUDENT GUIDE

of your additional curriculum course study is incumbent on your timely submission and maintenance of these records.

Thesis research and presentation of your work to the faculty and your peers is another graduation requirement. Your choice of an area for thesis research is something not to be taken lightly. Start your search early by being attentive to current work in the department by the professors and other students. You may be able to continue existing research. Perhaps you have a personal passionate pursuit that you want to explore! Given enough time, it could be developed into an acceptable thesis proposal complete with adequate funding for you execute.

Please consider the faculty and staff as the most valuable resource in your academic endeavors. We are here for your benefit. Without you, there is no Naval Postgraduate School and the service that it provides. We will do our part to make your tour successful through a blend of quality education, career guidance and esprit de corps. I look forward to continued interaction with each and every one of you! My door is always open!

Stan Cunningham  
CDR USN  
Program Officer, Mechanical Engineering

## 2 Roadmap

The following is provided as guidance. With the exception of the first quarter all other items should be completed by the end of the indicated quarter.

Quarter	To Do
1	<ul style="list-style-type: none"> <li>• Fill out (with the Program Officer) the Transcript Evaluation form and pick an initial matrix.</li> <li>• Fill out tentatively (with the Program Officer or Academic Associate) the BSME Equivalency form (if needed) and the MSME Checklist.</li> </ul>
2	
3	<ul style="list-style-type: none"> <li>• Start interviewing the faculty members for potential thesis topics. Make sure you read about your Thesis before you do that.</li> </ul>
4	<ul style="list-style-type: none"> <li>• Pick your Thesis Advisor, area of specialization, and schedule your electives.</li> </ul>
5	<ul style="list-style-type: none"> <li>• If you haven't picked a Thesis Advisor already, delay no longer!</li> </ul>
6	<ul style="list-style-type: none"> <li>• Fill out (with your Thesis Advisor) and submit (to the Academic Associate) the Thesis Approval Form.</li> <li>• Start working on your thesis.</li> </ul>
7	<ul style="list-style-type: none"> <li>• Start your thesis slots (maybe earlier).</li> <li>• Fill out final versions of the BSME Equivalency and MSME Checklist forms.</li> </ul>
8	<ul style="list-style-type: none"> <li>• Final revisions (if needed) of the BSME Equivalency and MSME Checklist forms.</li> <li>• Fill out the Graduating Student Exit Survey.</li> </ul>
After you graduate	<ul style="list-style-type: none"> <li>• Let us know when you reach an important milestone in your career, change career paths, etc.</li> </ul>

### 3 Objectives

The Objectives of the Mechanical Engineering Educational Program are:

*The overall educational objective of the Mechanical Engineering program is to support the NPS mission by producing graduates who have knowledge and technical competence, at the advanced level in Mechanical Engineering, to support national security.*

In order to achieve this goal, the specific objectives are to produce graduates who have:

- The ability to identify, formulate, and solve technical and engineering problems in Mechanical Engineering and related disciplines using the techniques, skills and tools of modern practice, including modeling and simulation. These problems may include issues of research, design, development, procurement, operation, maintenance or disposal of engineering components and systems for military applications.
- The ability to provide leadership in the specification of military requirements, in the organization and performance of research, design, testing, procurement and operation of technically advanced, militarily effective systems. The graduate must be able to interact with personnel from other services, industry, laboratories and academic institutions, and be able to understand the role that engineering and technology have in military operations, and in the broader national and global environment.
- The ability to communicate advanced technical information effectively in both oral and written form.

## **4 Degree Requirements**

### **4.1 *MS in Mechanical Engineering***

- Completed work equivalent to BS requirements of the department. Students who do not have a BS in Mechanical Engineering with an ABET accreditation should fill out the BSME equivalency form.
- Minimum of 32 quarter hours of credits in 3000 and 4000 level courses, of which at least 12 must be at the 4000 level.
- Of the 32 quarter hours at least 24 quarter hours must be in courses offered by the Mechanical Engineering Department.
- An acceptable thesis for a minimum of 16 credits.

### **4.2 *MS in Engineering Science***

- Acceptable Academic Background.
- Minimum of 32 quarter hours of credits in 3000 and 4000 level courses, of which at least 12 must be at the 4000 level.
- Of the 32 quarter hours at least 24 quarter hours must be in courses offered by the Mechanical Engineering Department.
- An acceptable thesis for a minimum of 16 credits.

### **4.3 *MS in Materials Science***

- 32 quarter hours of graduate work in Materials Science.
- At least 16 of the 32 quarter hours must be at the 4000 level.
- In addition, at least 8 quarter hours must be earned outside of Materials Science and Engineering.

### **4.4 *Mechanical Engineer***

- Superior academic record – graduate QPR of 3.70 or better.
- A candidate may apply after completion of approximately one year of studies.
- 60 quarter hours of graduate level credits in ME and MTS.
- At least 30 of the 60 credit hours must be at the 4000 level.
- In addition, at least 12 credit hours must be earned outside the department.
- An acceptable thesis of 32 credits.

### **4.5 *Total Ship Systems Engineering Program***

- Any one of the above plus a sequence of 8 TSSE courses (including lectures and design work). For course requirements see Prof. Calvano or Prof. Papoulias.

## **5 What to Do and When**

Fill out documents and sample forms are provided in the Appendices.

### **5.1 Transcript Evaluation**

Fill out the attached Transcript Evaluation form as soon as you check in. See the Program Officer for help.

### **5.2 Matrix**

Several matrices are provided as samples. Please see the Program Officer or the Academic Associate for questions/additions/deletions in your own matrix.

### **5.3 BSME Equivalency Form**

If you are applying for the MSME degree and you do not have a BS in Mechanical Engineering from an ABET accredited University, you need to fill out this form. Do this as soon as you get your matrix. This form should be approved before your graduation. Look at the samples and read the instructions carefully. You can calculate the course quarter credit hours as the number of weekly lectures plus one-half of the weekly lab periods; e.g., a course that is listed as 3-2 has 4 credit hours.

### **5.4 MSME Checklist**

All MSME students are required to fill out this form. Same guidelines apply as for section 4.3.

### **5.5 Thesis Approval Form**

You need to have this form filled out at least one quarter before your first thesis slot. You need to have selected a specialization track, thesis area, electives, and a thesis advisor before you fill out this form. A good rule of thumb is during your third quarter or so. Remember that 4000 level courses are often offered only once a year.

### **5.6 Graduating Student Exit Survey**

This is very important, please fill out this form and submit it to the chairman when you graduate.

### **5.7 Feedback**

Let us know how you are doing in your career, especially when you get a promotion, change career paths, or reach another milestone. You can do this by e-mail or by filling out the alumni feedback form in our web site at <http://www.nps.navy.mil/me/>.



## 6 Thesis

### 6.1 Overview

This overview will describe the thesis, why it is very important to your graduate study, what are the steps that you will need to do and when they should or must be done, how to find an advisor, and the resources that are available to help you along the way. In the following section, questions and answers are provided for some common questions.

A thesis is a “position or proposition that a person (as a candidate for scholastic honors) advances and offers to maintain by argument.” and a document containing results of original research and especially supporting a specific view.

The thesis is the most important part of your graduate education. While the course work lays the foundation by providing analytical methods and tools, it is the thesis that provides to you the opportunity to use this knowledge in a new, original and creative manner. During your thesis research you will be able to consolidate what you have already learned, and possibly extend this by further self-study, and to use this body of knowledge to attack a new problem. The thesis will hopefully be your crowning achievement of your graduate study, and will be your introduction to the community of scholars.

The first step in the thesis process is choosing an advisor and a topic. While your formal thesis slots may be in the last 2 or 3 quarters at NPS, it is very important that you have a thesis advisor and topic chosen well before this, preferably a year or so before you plan to graduate. During the time between choosing an advisor/topic and the start of your thesis slots, you should meet regularly with your advisor and spend a few hours a week reading background material and thinking about the problem.

The method for choosing your topic and advisor is completely up to you. However, you are strongly advised to talk to every faculty member in all the areas that you have any interest before making decisions. There are several questions you might want to ask yourself, before talking to the faculty. What type of work do you most enjoy? Generally, thesis research may be categorized as analytical (e.g. using a pencil and paper for mathematical modeling and derivation of solutions), computational (e.g. using finite element technique or computational fluid mechanics to find solutions), experimental (e.g. designing, building, or modifying an existing set-up to obtain new data) or some combination of the three. It is generally advisable that you take a course from a professor before you make a commitment to work for him or her. The Mechanical Engineering Faculty periodically schedule thesis opportunity presentations, where they will discuss their current research interests and the available topics. In addition, there is a ME website which contains short written descriptions for current thesis topics of ME faculty. You may talk to fellow students, who are close to graduating to discuss what they have done and how they enjoyed their experience. However, they probably will not be as good a source of what the available research topics are as the faculty members, themselves.

## MECHANICAL ENGINEERING DEPARTMENT STUDENT GUIDE

Finally, you may wish to review previous thesis, as well as conference and journal publications from the various faculty members.

After you find an advisor and agree on the topic, you are required to fill out a thesis approval form, which must be signed by the thesis advisor, the Academic Associate and the Chairman of the Mechanical Engineering Department.

While your advisor will help you along the way and provide broad guidance and feedback, it is the responsibility of the student to be self-motivated and to initiate all of the steps. Do not expect your advisor to provide a detailed, step-by-step, road map for you. You should be independent and think through problems first, before asking your advisor. However, that does not in any way mean you should avoid meeting with your advisor. You should meet regularly with your advisor to discuss what you have done, what issues have arisen, how you plan to solve them, and what your next steps should be.

One common problem faced by researchers, is the failure to sufficiently limit the scope of their work. Being overly broad can lead to a lack of focus and prevent any contribution from being made. It may seem to you that your advisor has asked you to solve a problem that you consider trivial and you may be inclined to broaden the scope. Stay focused on the immediate problem. If you solve the problem then by all means go on to a larger problem. But initially, stay focus on a narrow and well-defined problem.

One way that you can help yourself is to write a short Thesis Proposal. It can be useful in helping to consolidate your understanding and focusing your future work. This may be written after you have been working on the problem for several months, have read dozens of articles and it may contain the following elements:

1. Introduction to the problem. This describes the problem and why it is important.
2. State of the art. Literature review and what is not known.
3. Objectives. Your goals for the work. What would be the desired outcome(s). Be specific. Do not say to better understand something.
4. Proposed work. Very limited and specific.

For you to make an original contribution, it generally requires that you have an understanding of what is already known, by experts in your field. Therefore, one of the primary resources on which you will depend is the NPS library and the reference staff. While the world-wide-web is becoming an increasing source of information, and you should make use of it, there are many primary sources, such as books and journals, which are not available on the web. Most of the information on the web is not archival in nature – that is, it might not exist if a certain site is closed. One of the most valuable skills you should learn during your thesis is how to obtain and process information and how to synthesize new results from that original information.

After your research is complete you will be required to write and submit a thesis document. For many of you it will be the longest document that you have written. There are several sources available to help you in writing the document, including “How to

## MECHANICAL ENGINEERING DEPARTMENT STUDENT GUIDE

Write a Thesis” by the Mechanical Engineering Department and several guidelines and templates available on the NPS web site.

Finally you are required to make an oral presentation of your thesis research to the faculty and students of the Mechanical Engineering Department. The presentation is approximately fifteen minutes with about a 5-minute question and answer period. A document on how to prepare and deliver this presentation is available from the Mechanical Engineering Department.

In addition to the forms and the guidelines contained in this document, NPS has extra requirements with regards to thesis processing and other forms to fill out. You will find all of this information in <http://web.nps.navy.mil/~code09/research1.html>

### **6.2 Common Questions and Answers about the Thesis**

**Q** *What is a Thesis?*

**A** A thesis is an independent and original piece of research work, where the student forwards a proposition and supports the validity of this in a formal written document. The thesis is a requirement for all MSME degrees.

**Q** *What is a Thesis advisor?*

**A** A thesis advisor is a faculty member who provides guidance and advice to the student on the conduct of the research. Typically, the advisor, who is an expert in the field, supplies the problem to which you seek a solution.

**Q** *Who can serve as a thesis advisor?*

**A** The primary thesis advisor must be a “permanent” member of the NPS ME faculty. However, you may have a co-advisor or a second reader from another department, or even outside the school.

**Q** *When do I start the thesis?*

**A** Generally, you should start working on the thesis a year or more before you intend to graduate. While your thesis slots may not occur until your last 6 months, you should have chosen a thesis advisor and be hard at work long before this time.

**Q** *How long does the thesis require?*

**A** Generally, it requires almost a full year. Therefore, do not wait until the last minute before your thesis slots to find an advisor and begin your work.

**Q** *Can I take additional thesis slots?*

**A** No, not for the Master’s Thesis, per se. However, it is possible to take a directed study course (ME4902), which may contain material that is related to your thesis research. In this case, you need approval from the faculty who will direct the course, Academic Associates, Program Officer, and Chairman of Mechanical Engineering. For the Engineer’s Thesis, seven (7) slots are required.

**Q** *Can I do a joint thesis with other students?*

## MECHANICAL ENGINEERING DEPARTMENT STUDENT GUIDE

**A** No. Each student is required to submit a separate, individual thesis, which may only contains their own work, for the degree requirements to be met.

**Q** *Can I combine the thesis with courses and obtain joint credit?*

**A** No. Although you may be able to do a project for a course that is related to you thesis research.

**Q** *How do I select a topic/advisor?*

**A** That is entirely up to you. You should talk to every faculty member in the department in the area(s) in which you are interested. Generally it is best to work for someone who you are familiar, such as someone from whom you have taken a course. Since you will be required to interact your advisor on a regular basis it should be someone with whom you are comfortable.

**Q** *Is any funding required?*

**A** No, not on the part of the student. It is the responsibility of the advisor to supply any funding that will be required to complete the research.

**Q** *Are there additional resources available to help me write my thesis and present my results?*

**A** Yes. The ME department has documents available called, “How to Write a Thesis”, and “How to Make a Technical Presentation“ to help you prepare your thesis and presentation.

## **7 For More Information**

For more information please refer to the Department's web site at <http://www.nps.navy.mil/me/> or see the Program Officer or the Academic Associate.

For more information on TSSE and past student projects refer to the TSSE web site at <http://www.nps.navy.mil/tsse/> or see Prof. Calvano or Prof. Papoulas.

## 8 Appendices

The following appendices are provided:

1. [Transcript Evaluation Form](#)
2. [Typical Course Scheduling](#)
3. [Sample Matrices](#)
4. [BSME Equivalency Form and Sample](#)
5. [MSME Checklist Form and Sample](#)
6. [Thesis Approval Form](#)
7. [Graduating Student Exit Survey](#)

### ***8.1 Transcript Evaluation***

Fill out the attached Transcript Evaluation form as soon as you check in. See the Program Officer for help.

# MECHANICAL ENGINEERING DEPARTMENT STUDENT GUIDE


## TRANSCRIPT EVALUATION

NAME \_\_\_\_\_ RANK \_\_\_\_\_ SERVICE \_\_\_\_\_ YEAR GRP \_\_\_\_\_

DEGREE \_\_\_\_\_ FROM \_\_\_\_\_ YEAR \_\_\_\_\_

FIANL QPR \_\_\_\_\_ APC: \_\_\_\_\_ ETA \_\_\_\_\_

CURRICULUM: Direct 460 Tech Ref SEA SERVICE \_\_\_\_\_ yrs. \_\_\_\_\_ mos.

ABET BSME: Yes No 

Had Previous Chemistry  
Had No Previous Chemistry

S/S DESCRIPTION:

SUBJECT AREA	A	B	C	D	F
<b><u>MATHEMATICS</u></b>					
Engineering Math/ Pre-Calculus					
Calculus					
Diff Equations					
Linear Algebra					
Vector Analysis					
Probs & Stats					
Others					
<b><u>SCIENCE</u></b>					
Physics					
Chemistry					
Statics					
Dynamics					
Kinematics					
Mechanics					
Strength of Materials					
Others					
<b><u>MECHANICAL ENGR</u></b>					
Thermo & Heat Transfer					
Fluid Mechanics					
Solids					
Sturctures					
Design					
ME Laboratory					
Others					
<b><u>ELECTRICAL ENGR</u></b>					
Circuits					
Electronics					
Controls					
E&M Energy Conversion					
Computer Networks					
Others					

COMMENTS:

RECOMMENDATIONS (including potential validations):



**8.2 Typical Course Scheduling**

Number	Title		Fall	Win	Spr	Sum
ME0810	Thesis Research	0/8	X	X	X	X
ME0952	Special Topics in Mechanical Engineering	1/0	X	X	X	X
ME1000	Preparation for PE Registration	3/0	0	0	0	X
ME2101	Engineering Thermodynamics	4/2	X	0	X	0
ME2201	Introduction to Fluid Mechanics	3/2	X	0	X	0
ME2503	Engineering Statics and Dynamics	5/0	X	0	X	0
ME2601	Mechanics of Solids I	4/1	0	X	0	X
ME2801	Introduction to Eng. System Dynamics	3/2	X	0	X	0
ME3150	Heat Transfer	4/1	0	X	0	X
ME3201	Applied Fluid Mechanics	4/1	0	X	0	X
ME3240	Marine Power and Propulsion	4/2	0	X	0	X
ME3450	Computational Methods in Mech. Eng.	3/2	X	0	X	0
ME3521	Mechanical Vibration	3/2	0	X	0	X
ME3611	Mechanics of Solids II	4/0	X	0	X	0
ME3711	Design Of Machine Elements	4/1	X	0	X	0
ME3712	Capstone Design Project	1/6	0	X	0	X
ME3801	Classical Control of Naval Eng. Systems	3/2	0	X	0	X
ME4160	Applications of Heat Transfer	4/0	0	0	0	0
ME4161	Conduction Heat Transfer	4/0	0	X	0	0
ME4162	Convection Heat Transfer	4/0	X	0	0	0
ME4163	Radiation Heat Transfer	4/0	0	0	X	0
ME4202	Compressible Flow	3/0	0	0	0	0
ME4211	Applied Hydrodynamics	4/0	0	0	0	0
ME4220	Viscous Flow	4/0	0	0	0	X
ME4240	Advanced Topics in Fluid Dynamics	4/0	0	X	0	0
ME4300	Weaponengineering	3/2	0	X	0	0
ME4420	Marine Gas Turbines	4/0	X	0	0	0
ME4522	FEM in Structural Dynamics	4/0	X	0	0	0
ME4525	Naval Ship Shock Design and Analysis	4/0	0	0	0	X
ME4550	Random Vibrations and Spectral Analysis	3/2	0	X	0	0
ME4612	Advanced Mechanics of Solids	4/0	0	X	0	0
ME4613	Finite Element Methods	4/0	0	0	X	0
ME4620	Theory of Continuous Media	4/0	0	0	0	0
ME4731	Engineering Design Optimization	4/0	0	0	0	X
ME4811	Multivariable Control of Ship Systems	3/2	X	0	0	0
ME4812	Fluid Power Control	3/2	0	0	0	0
ME4821	Advanced Dynamics	3/2	0	0	X	0

# MECHANICAL ENGINEERING DEPARTMENT STUDENT GUIDE

Number	Title		Fall	Win	Spr	Sum
ME4823	Dynamics of Marine Vehicles	4/0	0	X	0	0
ME4825	Marine Propulsion Control	3/2	0	0	0	0
ME4902	Advanced Study in ME	V/0	X	X	X	X
MS2201	Intro. to Materials Science and Eng.	3/2	0	X	0	X
MS3202	Prop., Perf. & Failure of Eng. Materials	3/2	X	0	X	0
MS3214	Interm. Materials Science and Engineering	4/0	0	0	0	0
MS3304	Corrosion and Marine Env. Deterioration	3/2	0	0	X	0
MS3606	Intro. to Welding and Joining Metallurgy	3/2	X	0	0	0
MS4215	Phase Transformations	3/2	0	0	0	0
MS4312	Characterization of Advanced Materials	3/2	0	0	X	0
MS4811	Mech. Behavior of Engineering Materials	4/0	X	0	0	0
MS4822	The Eng. and Sci. of Composite Materials	4/0	0	X	0	0
MS4902	Special Topics in Materials Science	V/0	X	X	X	X
TS3000	Electrical Power Engineering	3/2	X	0	0	0
TS3001	Fund. Prin. of Naval Architecture	3/2	0	X	0	X
TS3002	Prin. of Ship Design and Case Studies	3/2	0	X	0	0
TS3003	Naval Combat System Elements	3/2	0	X	0	0
TS4000	Naval Combat System Engineering	3/2	0	0	X	0
TS4001	Integration of Naval Engineering Systems	3/2	0	0	X	0
TS4002	Ship Design Integration	2/4	0	0	0	X
TS4003	Total Ship Systems Engineering	2/4	X	0	0	0
EC1010	Introduction to MATLAB	1/1	X	X	X	X
EO2102	Intro. to Circuit and Power Systems	4/2	0	X	0	X
OS3104	Statistics for Science and Engineering	4/0	X	X	X	X
AA3802	Aeronautical Measurement Techniques	3/2	0	X	0	X
AA4507	Comp. Fluid Dynamics and Heat Transfer	3/2	0	X	0	0
MA1042	Matrix Algebra	2/0	0	X	0	X
MA1118	Multi-Variable Calculus	5/2	X	X	X	X
MA2139	Intro. to Diff. Eqs. and Vector Calculus	5/0	X	X	X	X
MA3132	Partial Diff. Eqs. and Integral Transforms	4/0	X	X	X	X
MA3232	Numerical Analysis	4/1	X	X	X	X
NW3230	Strategy and Policy: The Am. Experience	4/2	X	X	X	X

### **8.3 *Sample Matrices***

The following matrices are provided as samples. Please see the Program Officer or the Academic Associate for questions/additions/deletions in your own matrix.

# MECHANICAL ENGINEERING DEPARTMENT STUDENT GUIDE

FALL

NAME

OCT

Q T R								
1		ME2101 Thermodynamics (4-2)	MA1118 Multi-Variable Calculus (5-2)	ME2503 Engineering Statics & Dynamics (5-0)	NW3230 Maritime and Joint Strategic Planning (4-0)	EC1010 MATLAB (1-1)		
2		MA 2139 Diff Eqns with Vector Calculus (5-0)	ME2601 Mechanics of Solids I (4-1)	MS2201 Materials Science (3-2)	OS3104 Probs & Stats for Engineers (4-0)	MA1042 Matrix Algebra (2-0)		
3		MA3132 Partial Differential Equations (4-0)	MA3232 Numerical Analysis (4-1)	ME3611 Mechanics of Solids II (4-0)	ME2201 Fluid Mechanics I (3-2)			
4		EO2102 Intro to Circuit & Power Systems Analysis (4-2)	ME3521 Mechanical Vibrations (3-2)	ME3201 Applied Fluid Mechanics (4-1)	ME3150 Heat Transfer (4-1)			
5		ME2801 System Dynamics (3-2)	MS3202 Failure Analysis and Prevention (3-2)	ME3711 Machine Design (4-1)	ME3450 Computational Methods in Mech Engineering (3-2)			
6		ME3801 Automatic Controls (3-2)	ME3240 Marine Power and Propulsion (4-2)	ME3712 Systems Design (4-2)	ME4999 Specialization Elective			
7		ME0810 Thesis	ME0810 Thesis	MS3606 Welding (3-2)	ME4999 Specialization Elective			
8		ME0810 Thesis	ME0810 Thesis	TS3001 Naval Architecture (3-2)	ME4999 Specialization Elective			

# MECHANICAL ENGINEERING DEPARTMENT STUDENT GUIDE

WINTER		NAME				JAN		
Q T R	ref							
1		EO2102 Intro to Circuit & Power Systems Analysis (4-2)	MA1118 Multi-Variable Calculus (5-2)	MS2201 Materials Science (3-2)	NW3230 Maritime and Joint Strategic Planning (4-0)	EC1010 MATLAB (1-1)		
2		MA 2139 Diff Eqns with Vector Calculus (5-0)	ME2503 Engineering Statics & Dynamics (5-0)	ME2101 Thermodynamics (4-2)	ME2801 System Dynamics (3-2)	MA1042 Matrix Algebra (2-0)		
3		MA3132 Partial Differential Equations (4-0)	MA3232 Numerical Analysis (4-1)	ME2601 Mechanics of Solids I (4-1)	ME3801 Automatic Controls (3-2)			
4		ME3611 Mechanics of Solids II (4-0)	ME2201 Fluid Mechanics I (3-2)	ME3711 Machine Design (4-1)	MS3202 Failure Analysis and Prevention (3-2)			
5		ME3201 Applied Fluid Mechanics (4-1)	ME3150 Heat Transfer (4-1)	ME3712 Systems Design (4-2)	OS3104 Probs & Stats for Engineers (4-0)			
6		ME0810 Thesis	MS3304 Corrosion (3-2)	ME4999 Specialization Elective	ME4999 Specialization Elective			
7		ME0810 Thesis	ME3521 Mechanical Vibrations (3-2)	TS3001 Naval Architecture (3-2)	ME3240 Marine Power and Propulsion (4-2)			
8		ME0810 Thesis	ME0810 Thesis	ME4999 Specialization Elective	ME3450 Computational Methods in Mech Engineering (3-2)			

# MECHANICAL ENGINEERING DEPARTMENT STUDENT GUIDE

SPRING

NAME

APR

Q T R								
1		MA1118 Multi-Variable Calculus (5-2)	ME2101 Thermodynamics (4-2)	ME2503 Engineering Statics & Dynamics (5-0)	NW3230 Maritime and Joint Strategic Planning (4-0)	EC1010 MATLAB (1-1)		
2		MA 2139 Diff Eqns with Vector Calculus (5-0)	ME2601 Mechanics of Solids I (4-1)	MS2201 Materials Science (3-2)	EO2102 Intro to Circuit & Power Systems Analysis (4-2)	MA1042 Matrix Algebra (2-0)		
3		MA3132 Partial Differential Equations (4-0)	MA3232 Numerical Analysis (4-1)	ME2201 Fluid Mechanics I (3-2)	ME3611 Mechanics of Solids II (4-0)			
4		ME3521 Mechanical Vibrations (3-2)	ME3201 Applied Fluid Mechanics (4-1)	ME3150 Heat Transfer (4-1)	OS3104 Probs & Stats for Engineers (4-0)			
5		ME2801 System Dynamics (3-2)	MS3202 Failure Analysis and Prevention (3-2)	ME3711 Machine Design (4-1)	ME3450 Computational Methods in Mech Engineering (3-2)			
6		ME3801 Automatic Controls (3-2)	ME3240 Marine Power and Propulsion (4-2)	ME3712 Systems Design (4-2)	ME4999 Specialization Elective			
7		ME0810 Thesis	ME0810 Thesis	ME4999 Specialization Elective	MS3304 Corrosion (3-2)			
8		ME0810 Thesis	ME0810 Thesis	ME4999 Specialization Elective	TS3001 Naval Architecture (3-2)			

# MECHANICAL ENGINEERING DEPARTMENT STUDENT GUIDE

SUMMER

NAME

JUL

Q T R	ref							
1		EO2102 Intro to Circuit & Power Systems Analysis (4-2)	MA1118 Multi-Variable Calculus (5-2)	MS2201 Materials Science (3-2)	NW3230 Maritime and Joint Strategic Planning (4-0)	EC1010 MATLAB (1-1)		
2		MA 2139 Diff Eqns with Vector Calculus (5-0)	ME2503 Engineering Statics & Dynamics (5-0)	ME2101 Thermodynamics (4-2)	ME2801 System Dynamics (3-2)	MA1042 Matrix Algebra (2-0)		
3		MA3132 Partial Differential Equations (4-0)	MA3232 Numerical Analysis (4-1)	ME2601 Mechanics of Solids I (4-1)	OS3104 Probs & Stats for Engineers (4-0)			
4		ME3611 Mechanics of Solids II (4-0)	ME2201 Fluid Mechanics I (3-2)	MS3202 Failure Analysis and Prevention (3-2)	ME3711 Machine Design (4-1)			
5		ME3521 Mechanical Vibrations (3-2)	ME3150 Heat Transfer (4-1)	ME3201 Applied Fluid Mechanics (4-1)	ME3712 Systems Design (4-2)			
6		ME0810 Thesis	MS3606 Welding (3-2)	ME4999 Specialization Elective	ME4999 Specialization Elective			
7		ME0810 Thesis	ME3801 Automatic Controls (3-2)	TS3001 Naval Architecture (3-2)	ME3240 Marine Power and Propulsion (4-2)			
8		ME0810 Thesis	ME0810 Thesis	ME4999 Specialization Elective	ME3450 Computational Methods in Mech Engineering (3-2)			

# MECHANICAL ENGINEERING DEPARTMENT STUDENT GUIDE

**TSSE** - FALL/SPRING

NAME \_\_\_\_\_

SEP

Q T R								
1	1 FALL	ME2101 Thermodynamics (4-2)	MA1118 Multi-Variable Calculus (5-2)	ME2503 Engineering Statics & Dynamics (5-0)	NW3230 Maritime and Joint Strategic Planning (4-0)	EC1010 MATLAB (1-1)		
2	2 WNTR	MA 2139 Diff Eqns with Vector Calculus (5-0)	ME2601 Mechanics of Solids I (4-1)	MS2201 Materials Science (3-2)	OS3104 Probs & Stats for Engineers (4-0)			
3	3 SPRG	MA3132 Partial Differential Equations (4-0)	MA3232 Numerical Analysis (4-1)	ME3611 Mechanics of Solids II (4-0)	ME2201 Fluid Mechanics I (3-2)			
4	4 SMR	EO2102 Intro to Circuit & Power Systems Analysis (4-2)	ME3521 Mechanical Vibrations (3-2)	ME3201 Applied Fluid Mechanics (4-1)	TS3001 Naval Architecture (3-2)	ME3150 Heat Transfer (4-1)		
5	1 FALL	ME2801 System Dynamics (3-2)	MS3202 Failure Analysis and Prevention (3-2)	ME3711 Machine Design (4-1)	TS3000 Electrical Power Engr (3-2)			
6	2 WNTR	ME3801 Automatic Controls (3-2)	ME4999 Specialization Elective	TS3002 Principles of Ship Design (3-2)	TS3003 Combat Systems Elements (3-2)			
7	3 SPRG	ME3450 Computational Methods in Mech Engineering (3-2)	ME4999 Specialization Elective	TS4000 Naval Combats Sys Design (3-2)	TS 4001 Design of Naval Eng Subsys (2-4)			
8	4 SMR	ME0810 Thesis	ME0810 Thesis	ME3240 Marine Power and Propulsion (4-2)	TS4002 Comp Adv Design Concepts (2-4)			
9	1 FALL	ME0810 Thesis	ME0810 Thesis	MS3606 Welding (3-2)	TS4003 Total Ship Syst Eng (2-4)			



**GENERIC MECHANICAL ENGINEERING CURRICULUM with (Sched) and (Pre-regs)**

Q T R					
1	MA1118 (1,2,3,4) Multi-Variable Calculus (5-2) (MA117/EQ)	ME2101 (1,3) Thermodynamics (4-2) (MA1118)	ME2503 (1,3) Engineering Statics & Dynamics (5-0) (MA1118-C)	NW3230 (1,2,3,4) Maritime and Joint Strategic Planning (4-0) (-)	EC1010 (1,2,3,4) MATLAB (1-1) (-)
2	MA 2139 (1,2,3,4) Diff Eqns with Vector Calculus (5-0) (MA1118)	ME2601 (2,4) Mechanics of Solids I (4-1) (ME2503/MA118)	MS2201 (2,4) Materials Science (3-2) (-)	OS3104 (2) Probs & Stats for Engineers (4-0) (-)	MA1042 (1,2,3,4) Matrix Algebra (2-0) (-)
3	MA3132 (1,2,3,4) Partial Differential Equations (4-0) (MA2139)	MA3232 (1,2,3,4) Numerical Analysis (4-1) (MA2139/EC1010)	ME3611 (1,3) Mechanics of Solids II (4-0) (ME2601)	ME2201 (1,3) Fluid Mechanics I (3-2) (ME2503)	
4	EO2102 (2,4) Intro to Circuit & Power Systems Analysis (4-2) (-)	ME3521 (2,4) Mechanical Vibrations (3-2) (ME2503/ME2601/MA2139)	ME3201 (2,4) Applied Fluid Mechanics (4-1) (ME2101/ME2201/MA3132)	ME3150 (2,4) Heat Transfer (4-1) (ME2101/ME2201/MA3132-C)	
5	ME2801 (1,3) System Dynamics (3-2) (ME2503/MA2139)	MS3202 (1,3) Failure Analysis and Prevention (3-2) (MS2201)	ME3711 (1,3) Machine Design (4-1) (ME2601)	ME3450 (1,3) Computational Methods in Mech Engineering (3-2) (EC1010/MA3232/ME3150/ ME3201/ME3611)	
6	ME3801 (2,4) Automatic Controls (3-2) (ME2801)	ME3240 (2,4) Marine Power and Propulsion (4-2) (ME2101, ME2201)	ME3712 (2,4) Systems Design (4-2) (ME3711)	ME4999 Specialization Elective	
7	ME0810 Thesis	ME0810 Thesis	ME4999 Specialization Elective	MS3304 Corrosion (3) (3-2) (MS2201) - OR - MS3606 Welding (1) (3-2) (MS2201/MS3202)	
8	ME0810 Thesis	ME0810 Thesis	ME4999 Specialization Elective	TS3001 (2,4) Naval Architecture (3-2) (ME2201/ME2601)	

#### **8.4 *BSME Equivalency Form and Sample***

If you are applying for the MSME degree and you do not have a BS in Mechanical Engineering from an ABET accredited University, you need to fill out this form. Do this as soon as you get your matrix. You will be reminded to fill this out one quarter before you graduate. Look at the samples and read the instructions carefully. You can calculate the course quarter credit hours as the number of weekly lectures plus one-half of the weekly lab periods; e.g., a course that is listed as 3-2 has 4 credit hours.

## ***Department of Mechanical Engineering Checklist for BSME Degree Equivalence***

The Department of Mechanical Engineering at the Naval Postgraduate School is accredited at the Master of Science degree level through the Accreditation Board of Engineering and Technology. Students earning a Master of Science in Mechanical Engineering or a Degree of Mechanical Engineer at NPS, must either have attained an ABET accredited undergraduate Mechanical Engineering degree, or earned the equivalency of a Bachelor of Science Degree in Mechanical Engineering. Some courses from the student's undergraduate institution may count toward that equivalency, even though his final undergraduate may not have been in Mechanical Engineering. Some courses taken at NPS may also be applied to meeting this undergraduate equivalency. This checklist is provided to document the completion of that equivalency.

Student Name: \_\_\_\_\_ E-mail Address: \_\_\_\_\_

Month/year Enrolled: \_\_\_\_\_

I certify that the information on this form is correct.

**Student Signature:** \_\_\_\_\_

Undergraduate Institutions Attended:

INSTITUTION	DATE		DEGREE EARNED
	From	To	
	From	To	
	From	To	
	From	To	

**Do you already have an ABET accredited BSME degree? Circle one response only.**

**YES    Skip the rest of this form. Go directly to the MSME Checklist form.**

**NO     Complete the rest of this form. Then proceed to the MSME Chacklist.**

We certify that this student has met the minimum requirements for the equivalency of the BSME degree.

\_\_\_\_\_  
ME Program Officer, Date

\_\_\_\_\_  
ME Academic Associate, Date

\_\_\_\_\_  
ME Department Chair, Date

# MECHANICAL ENGINEERING DEPARTMENT STUDENT GUIDE

## I. Mathematics

- A. A minimum of 24 quarter credit hours or 16 semester credit hours of college-level mathematics is required. List all college-level mathematics courses passed with a grade of C or better. For each course, indicate the college or university where the course was taken, the course number, the course title, and the number of credit hours.

University	Course Number	Title	Quarter Credit Hours	Semester Credit Hours
Quarter Credit Hours Sub Total				
Semester Credit Hours Sub Total				

Total Math Credits (Qtr Credits + $(1.5 \times \text{Sem Credits})$ ):	
	(24 required)

- B. For each of the following mathematics subjects that has been studied, indicate the college or university where the subject was studied, the course number, and the course title. All courses must have been passed with a grade of C or better.

Subject	University	Course Number	Course Title
Multivariable Calculus			
Differential Equations			
Linear Algebra			
Statistics			

# MECHANICAL ENGINEERING DEPARTMENT STUDENT GUIDE

## II. Sciences

### A. Basic Science

A minimum of 24 quarter credit hours or 16 semester credit hours of college-level basic science is required. Studies must include both general chemistry and calculus based physics. List all college-level basic science courses passed with a grade of C or better. For each course, indicate the college or university where the course was taken, the course number, the course title, and the number of credit hours.

University	Course Number	Title	Quarter Credit Hours	Semester Credit Hours
Quarter Credit Hours Sub Total				
Semester Credit Hours Sub Total				

Total Basic Science Credits (Qtr Credits + $(1.5 \times \text{Sem Credits})$ ): <div style="border: 1px solid black; width: 100px; height: 20px; display: inline-block; vertical-align: middle;"></div> (24 required)
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## MECHANICAL ENGINEERING DEPARTMENT STUDENT GUIDE

### III. General Education

- A. A minimum of 24-quarter credit hours or 16 semester credit hours is required in subjects other than mathematics, basic science, computer science, and engineering. These general education courses should complement the technical content of the curriculum. Examples of traditional subjects in these areas are philosophy, religions, history, literature, fine arts, sociology, psychology, political science, anthropology, economics, and foreign language. Examples of non-acceptable courses include accounting, industrial management, finance, personnel administration, engineering economy, physical education and military science and training.

University	Course Number	Title	Quarter Credit Hours	Semester Credit Hours
		Quarter Credit Hours Sub Total		
		Semester Credit Hours Sub Total		

Total General Education Credits (Qtr Credits + (1.5 × Sem Credits)):		
		(24 required)

# MECHANICAL ENGINEERING DEPARTMENT STUDENT GUIDE

## IV. Engineering Science and Engineering Design

A minimum of 72 quarter credit hours or 48 semester credit hours of engineering science and design are required. Of those 54 quarter credit hours or 36 of the semester hours must be specifically in Mechanical Engineering and include both Thermal and Mechanical Systems.

- A. List all **Mechanical Engineering** courses passed with a grade of C or better. A minimum of 54 quarter hours or 36 semester hours are required. For each course, indicate the college or university where the course was taken, the course number, the course title, and the number of credit hours (weekly lecture hours plus one half of lab hours). Courses must include Thermal Systems and Mechanical Systems.

University	Course Number	Title	Quarter Credit Hours	Semester Credit Hours
Quarter Credit Hours Sub Total				
Semester Credit Hours Sub Total				

Total Mechanical Engr Credits (Qtr Credits + $(1.5 \times \text{Sem Credits})$ ): <div style="display: inline-block; width: 100px; height: 20px; background-color: #cccccc; vertical-align: middle;"></div> <div style="display: inline-block; vertical-align: middle;">(54 required)</div>
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# MECHANICAL ENGINEERING DEPARTMENT STUDENT GUIDE

- B. List all engineering courses **not** in Mechanical Engineering passed with a grade of C or better. For each course, indicate the college or university where the course was taken, the course number, the course title, and the number of credit hours. Combined with the above Mechanical Engineering Courses, a minimum of 72 quarter hours or 48 semester hours is required.

[illegible]

**Total Non-Mech Engineering Credits (Qtr Credits +  $(1.5 \times \text{Sem Credits})$ ):**



## MECHANICAL ENGINEERING DEPARTMENT STUDENT GUIDE

- C. Also, DoD officers are entitled to certain college credit based on service schools attended (Nuke Power School, DCA School, MPA School, etc.) If you have attended any technical DoD schools, including in a prior enlisted status, list those service schools by Title. See your Program Officer for evaluation of those courses based on publications by the American Council on Education. If applicable, the Engineering Science Hours may be added to the total as identified below.

Service School Title	Course Number	Mech Engr Semester Credit Hours	Eng Science Semester Credit Hours
<b>Total Service Related Mechanical Engr Science Credit Hours</b>			
<b>Convert Semester Hours to Quarter Hours (1.5 x Sem Hours): Mech Engr Science Service Qtr Credit Hours</b>			
<b>Total Service Related Engr Science Credit Hours</b>			
<b>Convert Semester Hours to Quarter Hours (1.5 x Sem Hours): Engr Science Service Qtr Credit Hours</b>			

D. Total Engineering Science Credit Hours:

Total Mechanical Engineering Science Credits (Sect IV. A. Previous Pages + Service Related Mechanical Engineering Science Hours Above):		<input type="text"/>	(54 required)
Total Non-Mech Engineering Credits (Sect IV. B. Previous Pages + Service Related Non-Mechanical Engineering Science Hours Above):		<input type="text"/>	
Total Engineering Science Credits (sum above):		<input type="text"/>	(72 required)

## MECHANICAL ENGINEERING DEPARTMENT STUDENT GUIDE

V. A major design experience at the advanced undergraduate level is required. It shall be based on the knowledge and skills acquired in earlier course work and incorporating engineering standards and realistic constraints. Briefly describe your major design experience. This requirement can be satisfied by completing a course with a major design experience that has been previously approved by the NPS ME department curriculum committee.

This image shows a blank sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

***Department of Mechanical Engineering  
Checklist for BSME Degree Equivalence- Sample***

The Department of Mechanical Engineering at the Naval Postgraduate School is accredited at the Master of Science degree level through the Accreditation Board of Engineering and Technology. Students earning a Master of Science in Mechanical Engineering or a Degree of Mechanical Engineer at NPS, must either have attained an ABET accredited undergraduate Mechanical Engineering degree, or earned the equivalency of a Bachelor of Science Degree in Mechanical Engineering. Some courses from the student's undergraduate institution may count toward that equivalency, even though his final undergraduate may not have been in Mechanical Engineering. Some courses taken at NPS may also be applied to meeting this undergraduate equivalency. This checklist is provided to document the completion of that equivalency.

Student Name: John D. Sample E-mail Address: \_\_\_\_\_

Month/year Enrolled: AUG 1998

I certify that the information on this form is correct.

**Student Signature:** \_\_\_\_\_

Undergraduate Institutions Attended:

INSTITUTION	DATE		DEGREE EARNED
ROSE STATE COLL	From 9/83	To 6/84	
FL COMM COL @ JAX	From 1/90	To 5/93	
UNIV OF OKLAHOMA	From 9/93	To 7/95	B.S. MATHEMATICS

We certify that this student has met the minimum requirements for the equivalency of the BSME degree.

\_\_\_\_\_  
**ME Program Officer, Date**

\_\_\_\_\_  
**ME Academic Associate, Date**

\_\_\_\_\_  
**ME Department Chair, Date**

Last Updated: April 2, 2002

# MECHANICAL ENGINEERING DEPARTMENT STUDENT GUIDE

## I. Mathematics

- A. A minimum of 24 quarter credit hours or 16 semester credit hours of college-level mathematics is required. List all college-level mathematics courses passed with a grade of C or better. For each course, indicate the college or university where the course was taken, the course number, the course title, and the number of credit hours.

University	Course Number	Title	Quarter Credit Hours	Semester Credit Hours
FL COMM COL	MAC2311	CALC & ANALYTICAL GEO		4
	MAC2312	CALC & ANALYT GEO II		4
	MAC2313	CANL & ANALYT GEO III		4
	MAB2302	DIFF EQNS		3
	STA2014	INTERMED STATISTICS		3
UNIV OF OK	MATH 3113	ENGINEERING MATH		3
	MATH 3333	LINEAR ALGEBRA		3
	MATH 3513	FOUNDATIONS ANALYSIS		3
	MATH 3123	ENGINEERING MATH II		3
	MATH 4433	INTRO TO ANALYSIS		3
	MATH 4163	INTER PARTIAL DIF EQNS		3
NPS	MAR142	MATRIX ALGEBRA	2	
Quarter Credit Hours Sub Total			2	
Semester Credit Hours Sub Total				36

Total Math Credits (Qtr Credits +  $(1.5 \times \text{Sem Credits})$ ): 56  
(24 required)

- B. For each of the following mathematics subjects that has been studied, indicate the college or university where the subject was studied, the course number, and the course title. All courses must have been passed with a grade of C or better.

Subject	University	Course Number	Course Title
Multivariable Calculus	FL COMM COL	MAC2313	CALC&ANALYGEO III
Differential Equations	FL COMM COL	MAB2302	DIFF EQNS
Linear Algebra	NPS	MAR142	MARTIX ALGEBRA
Statistics	FL COMM COL	STA2014	INTERM STATISTICS

# MECHANICAL ENGINEERING DEPARTMENT STUDENT GUIDE

## II. Sciences

### A. Basic Science

A minimum of 24 quarter credit hours or 16 semester credit hours of college-level basic science is required. Studies must include both general chemistry and calculus based physics. List all college-level basic science courses passed with a grade of C or better. For each course, indicate the college or university where the course was taken, the course number, the course title, and the number of credit hours.

University	Course Number	Title	Quarter Credit Hours	Semester Credit Hours
UNIV OF OK	GEOL 3633	INTRO OCEANOGRAPHY		3
	METR 1004	INTRO METEOROLOGY		4
ROSE STATE	CHEM 1114	INTRO CHEMISTRY		4
FL COMM COL	CHM1323	GENERAL CHEMISTRY		4
	CHM1045	CHEM QUAL I		4
	CHM1046	CHEM QUAL II		4
	PHY2048	PHYSICS W/ CALC		3
	PHY2049	PHYSICS W/ CALC II		3
Quarter Credit Hours Sub Total				
Semester Credit Hours Sub Total				29

Total Basic Science Credits (Qtr Credits + (1.5 × Sem Credits)):	43.5 (24 required)
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# MECHANICAL ENGINEERING DEPARTMENT STUDENT GUIDE

## III. General Education

- A. A minimum of 24-quarter credit hours or 16 semester credit hours is required in subjects other than mathematics, basic science, computer science, and engineering. These general education courses should complement the technical content of the curriculum. Examples of traditional subjects in these areas are philosophy, religions, history, literature, fine arts, sociology, psychology, political science, anthropology, economics, and foreign language. Examples of non-acceptable courses include accounting, industrial management, finance, personnel administration, engineering economy, physical education and military science and training.

University	Course Number	Title	Quarter Credit Hours	Semester Credit Hours
FL COMM COL	HUM1101	ENGLISH COMPOSITION		3
	HUM1102	ENGLISH COMPOSITION II		3
	SPC 2600	FUND SPEECH		3
	HUM2251	HUM 20 <sup>TH</sup> CENTURY		3
UNIV OF OK	HIS1483	US 1492-1865		3
	PSC 1113	GOVERNMENT OF THE US		3
	PHIL1113	INTRO TO LOGIC		3
Quarter Credit Hours Sub Total				
Semester Credit Hours Sub Total				21

Total General Education Credits (Qtr Credits + (1.5 × Sem Credits)):	<u>31.5</u> (24 required)
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## MECHANICAL ENGINEERING DEPARTMENT STUDENT GUIDE

### IV. Engineering Science and Engineering Design

A minimum of 72 quarter credit hours or 48 semester credit hours of engineering science and design are required. Of those 54 quarter credit hours or 36 of the semester hours must be specifically in Mechanical Engineering and include both Thermal and Mechanical Systems.

- A. List all **Mechanical Engineering** courses passed with a grade of C or better. A minimum of 54 quarter hours or 36 semester hours are required. For each course, indicate the college or university where the course was taken, the course number, the course title, and the number of credit hours. Courses must include Thermal Systems and Mechanical Systems.

University	Course Number	Title	Quarter Credit Hours	Semester Credit Hours
NPS	ME2440	COMP FOR MECH ENG	4	
	ME2501	STATICS	3	
	ME2502	DYNAMICS	4.5	
	ME2601	MECHANICS OF SOLIDS	4	
	MS2201	MATERIAL SCIENCE	4	
	ME2101	THERMODYNAMICS	4.5	
	ME2202	FLUID MECHANICS	4	
	ME2801	LINEAR CONTROL SYSTEM	4	
	ME1000	PROF ENGINEER REGIS	3	
	ME3150	APPLIED HEAT TRANSFER	4.5	
	MS3202	FAILURE ANALYSIS	4	
	ME3711	DESIGN OF MACHINE ELEM	4.5	
	MS3606	WELDING	4	
	ME3201	INTERM FLUID MECHANICS	4.5	
	TS3001	NAVAL ARCHITECTURE	4	
	ME3410	MECHANICAL ENG LAB	4	
	ME3450	COMPUTATIONAL METH	4	
	ME3240	MARINE PROPULSION/ PWR	5	
Quarter Credit Hours Sub Total			68.5	
Semester Credit Hours Sub Total				

Total Mechanical Engr Credits (Qtr Credits + (1.5 × Sem Credits)):	68.5 (54 required)
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## MECHANICAL ENGINEERING DEPARTMENT STUDENT GUIDE

- B. List all engineering courses **not** in Mechanical Engineering passed with a grade of C or better. For each course, indicate the college or university where the course was taken, the course number, the course title, and the number of credit hours. Combined with the above Mechanical Engineering Courses, a minimum of 72 quarter hours or 48 semester hours is required.

University	Course Number	Title	Quarter Credit Hours	Semester Credit Hours
NPS	EC1010	MATLAB	1.5	
Quarter Credit Hours Sub Total			1.5	
Semester Credit Hours Sub Total				

Total Non-Mech Engineering Credits (Qtr Credits + (1.5 × Sem Credits)):	1.5
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## MECHANICAL ENGINEERING DEPARTMENT STUDENT GUIDE

- C. Also, DoD officers are entitled to certain college credit based on service schools attended (Nuke Power School, DCA School, MPA School, etc.) If you have attended any technical DoD schools, including in a prior enlisted status, list those service schools by Title. See your Program Officer for evaluation of those courses based on publications by the American Council on Education. If applicable, the Engineering Science Hours may be added to the total as identified below.

Service School Title	Course Number	Mech Engr Semester Credit Hours	Eng Science Semester Credit Hours
Enlisted ET School	NV-1704-3218		3
<b>Total Service Related Mechanical Engr Science Credit Hours</b>			
<b>Convert Semester Hours to Quarter Hours (1.5 x Sem Hours): Mech Engr Science Service Qtr Credit Hours</b>			
<b>Total Service Related Engr Science Credit Hours</b>			3
<b>Convert Semester Hours to Quarter Hours (1.5 x Sem Hours): Engr Science Service Qtr Credit Hours</b>			4.5

### D. Total Engineering Science Credit Hours:

Total Mechanical Engineering Science Credits (Sect IV. A. Previous Pages + Service Related Mechanical Engineering Science Hours Above):		<u>68.5</u> (54 required)
Total Non-Mech Engineering Credits (Sect IV. B. Previous Pages + Service Related Non-Mechanical Engineering Science Hours Above):		<u>6.0</u>
Total Engineering Science Credits (sum above):		<u>74.5</u> (72 required)

## MECHANICAL ENGINEERING DEPARTMENT STUDENT GUIDE

V. A major design experience at the advanced undergraduate level is required. It shall be based on the knowledge and skills acquired in earlier course work and incorporating engineering standards and realistic constraints. Briefly describe your major design experience. This requirement can be satisfied by completing a course with a major design experience that has been previously approved by the NPS ME department curriculum committee.

Design Experience related to the lab courses involved with Machine Design and Failure Analysis. ***(describe the design related lab work and specific projects)***. Also had design related work in Nuke Power Officer School

### **8.5 *MSME Checklist and Sample***

All MSME students are required to fill out this form. Read the guidelines of section 4.3 first.

***Department of Mechanical Engineering  
Checklist for MSME Degree***

The Department of Mechanical Engineering at the Naval Postgraduate School is accredited at the Master of Science degree level through the Accreditation Board of Engineering and Technology and the Western Association of Schools and Colleges. Those accreditations are based on degree requirements set forth by the Mechanical Engineering Department at NPS and approved by the NPS Academic Council. This checklist is provided to document the completion of those degree requirements.

Student Name: \_\_\_\_\_ E-mail Address: \_\_\_\_\_

Month/year Enrolled: \_\_\_\_\_

I certify that the information on this form is correct.

**Student Signature:** \_\_\_\_\_

We certify that this student has met the minimum requirements for the MSME degree.

\_\_\_\_\_  
**ME Program Officer, Date**

\_\_\_\_\_  
**ME Academic Associate, Date**

\_\_\_\_\_  
**ME Department Chair, Date**

**Last Updated: June 6, 2002**

## MECHANICAL ENGINEERING DEPARTMENT STUDENT GUIDE

### 1. BSME Degree / Equivalence Requirement satisfied by (fill in one):

BSME degree from: \_\_\_\_\_ Month/Year \_\_\_\_\_

BSME Equivalence from NPS. Date (from completed checklist) \_\_\_\_\_

### 2. Thesis Requirement:

Number of Thesis Credits (16 minimum) \_\_\_\_\_

Thesis Advisor: \_\_\_\_\_

Thesis Title: \_\_\_\_\_

### 3. Competency / Track Requirement:

In completion of the requirements for a Master of Science Degree in Mechanical Engineering, a specific Specialization Track within the discipline of Mechanical Engineering must be declared. Identify the specialization track completed below:

<input type="checkbox"/> <b>Thermal Fluid Sciences</b> Must Complete Minimum of Two Courses Listed Below		
Course Number	Course Title	Taken
ME4160	Applications of Heat Transfer	<input type="checkbox"/>
ME4161	Conduction of Heat Transfer	<input type="checkbox"/>
ME4162	Convection of Heat Transfer	<input type="checkbox"/>
ME4163	Radiation Heat Transfer	<input type="checkbox"/>
ME4202	Compressible Flow	<input type="checkbox"/>
ME4211	Applied Hydrodynamics	<input type="checkbox"/>
ME4220	Viscous Flow	<input type="checkbox"/>
ME4240	Advanced Topics in Fluid Dynamics	<input type="checkbox"/>

<input type="checkbox"/> <b>Shock and Vibrations</b> Must Complete Minimum of Two Courses Listed Below		
Course Number	Course Title	Taken
ME4522	Finite Element Methods in Structural Dynamics	<input type="checkbox"/>
ME4525	Naval Ship Shock Design and Analysis	<input type="checkbox"/>
ME4731	Engineering Design Optimization	<input type="checkbox"/>
ME4550	Random Vibrations	<input type="checkbox"/>

## MECHANICAL ENGINEERING DEPARTMENT STUDENT GUIDE

<input type="checkbox"/> <b>Solid Mechanics</b> Must Complete Minimum of Two Courses Listed Below		
Course Number	Course Title	Taken
ME4612	Advanced Mechanics of Solids	<input type="checkbox"/>
ME4613	Finite Element Methods	<input type="checkbox"/>
ME4620	Theory of Continuous Media	<input type="checkbox"/>
<input type="checkbox"/> <b>Dynamic Systems and Control</b> Must Complete Minimum of Two Courses Listed Below		
Course Number	Course Title	Taken
ME4731	Engineering Design Optimization	<input type="checkbox"/>
ME4811	Multivariable Control of Ship Systems	<input type="checkbox"/>
ME4812	Fluid Power Control	<input type="checkbox"/>
ME4821	Advanced Dynamics	<input type="checkbox"/>
ME4823	Dynamics of Marine Vehicles	<input type="checkbox"/>
ME4825	Marine Propulsion Control	<input type="checkbox"/>

<input type="checkbox"/> <b>System Design</b> Must Complete Minimum of Two Courses Listed Below		
Course Number	Course Title	Taken
TS4001	Integration of Naval Engineering Systems	<input type="checkbox"/>
TS4003	Ship Design Integration	<input type="checkbox"/>
ME4731	Engineering Design Optimization	<input type="checkbox"/>

<input type="checkbox"/> <b>Materials Science</b> Must Complete Minimum of Two Courses Listed Below		
Course Number	Course Title	Taken
MS4215	Phase Transformation	<input type="checkbox"/>
MS4312	Characterization of Advanced Materials	<input type="checkbox"/>
MS4811	Mechanical Behavior of Engineering Materials	<input type="checkbox"/>
ME4613	Finite Element Methods	<input type="checkbox"/>
MS4822	Engineering and Science of Composite Materials	<input type="checkbox"/>

<input type="checkbox"/> <b>Exception Track</b> Must Include a Minimum of Two Courses in a Specialization Track Approved by both the Department Chairman and Academic Associate		
Course Number	Course Title	Taken
		<input type="checkbox"/>
		<input type="checkbox"/>
		<input type="checkbox"/>
		<input type="checkbox"/>
		<input type="checkbox"/>
		<input type="checkbox"/>

## MECHANICAL ENGINEERING DEPARTMENT STUDENT GUIDE

### 4. Course Credit Requirements:

The Master of Science degree in Mechanical Engineering requires at least 32-quarter hours of graduate level credits. At least 12-quarter hours must be at the 4000 level and at least 24 quarter hours must be in courses offered by the Mechanical Engineering Department. Identify courses to be counted toward the MSME degree:

***NOTE: NO COURSES COUNTED TOWARD A BSME EQUIVALENCY MAY BE COUNTED TOWARD MSME GRADUATION REQUIREMENTS***

A. List 4000 Level Courses applied toward MSME degree.

Course Number	Course Title	Quarter Hours
Total 4000 Level Hours		(12 required)

B. List All 3000 and 4000 Mechanical Courses applied toward MSME. Include duplicates of Mechanical Engineering Courses listed above.

Course Number	Course Title	Quarter Hours
Total Mechanical Engineering 3000 and 4000 level courses		(24 required)

MECHANICAL ENGINEERING DEPARTMENT STUDENT GUIDE

C. List all 3000 and 4000 level courses applied toward MSME degree (Mechanical Engineering non-Mechanical Engineering graduate level courses):

Course Number	Course Title	Quarter Hours
Total ALL MSME degree 3000 and 4000 level courses		<div></div> <div>(32 required)</div>



***Department of Mechanical Engineering  
Checklist for MSME Degree - Sample***

The Department of Mechanical Engineering at the Naval Postgraduate School is accredited at the Master of Science degree level through the Accreditation Board of Engineering and Technology and the Western Association of Schools and Colleges. Those accreditations are based on degree requirements set forth by the Mechanical Engineering Department at NPS and approved by the NPS Academic Council. This checklist is provided to document the completion of those degree requirements.

Student Name: John D. Sample E-mail Address: \_\_\_\_\_

Month/year Enrolled: AUG 1998

I certify that the information on this form is correct.

**Student Signature:** \_\_\_\_\_

We certify that this student has met the minimum requirements for the MSME degree.

\_\_\_\_\_  
**ME Program Officer, Date**

\_\_\_\_\_  
**ME Academic Associate, Date**

\_\_\_\_\_  
**ME Department Chair, Date**

Last Updated: April 11, 2002

## MECHANICAL ENGINEERING DEPARTMENT STUDENT GUIDE

### 1. BSME Degree / Equivalence Requirement satisfied by (fill in one):

BSME degree from: \_\_\_\_\_ Month/Year \_\_\_\_\_

BSME Equivalence from NPS. Date (from completed checklist) 4/11/2002

### 2. Thesis Requirement:

Number of Thesis Credits (16 minimum) 16

Thesis Advisor: Prof. Fotis A. Papoulas

Thesis Title: FREQUENCY RESONSE ANALYSIS OF T-ADS EXPERIMENTAL DATA

### 3. Competancy / Track Requirement:

In completion of the requirements for a Master of Science Degree in Mechanical Engineering, a specific Specialization Track within the discipline of Mechanical Engineering must be declared. Identify the specialization track completed below:

<input type="checkbox"/> <b>Thermal Fluid Sciences</b> Must Complete Minimum of Two Courses Listed Below		
Course Number	Course Title	Taken
ME4160	Applications of Heat Transfer	<input type="checkbox"/>
ME4161	Conduction of Heat Transfer	<input type="checkbox"/>
ME4162	Convection of Heat Transfer	<input type="checkbox"/>
ME4163	Radiation Heat Transfer	<input type="checkbox"/>
ME4202	Compressible Flow	<input type="checkbox"/>
ME4211	Applied Hydrodynamics	<input type="checkbox"/>
ME4220	Viscous Flow	<input type="checkbox"/>
ME4240	Advanced Topics in Fluid Dynamics	<input type="checkbox"/>

<input type="checkbox"/> <b>Shock and Vibrations</b> Must Complete Minimum of Two Courses Listed Below		
Course Number	Course Title	Taken
ME4522	Finite Element Methods in Structural Dynamics	<input type="checkbox"/>
ME4525	Naval Ship Shock Design and Analysis	<input type="checkbox"/>
ME4550	Random Vibrations	<input type="checkbox"/>

## MECHANICAL ENGINEERING DEPARTMENT STUDENT GUIDE

<input type="checkbox"/> <b>Solid Mechanics</b> Must Complete Minimum of Two Courses Listed Below		
Course Number	Course Title	Taken
ME4612	Advanced Mechanics of Solids	<input type="checkbox"/>
ME4613	Finite Element Methods	<input type="checkbox"/>
ME4620	Theory of Continuous Media	<input type="checkbox"/>
<input type="checkbox"/> <b>Dynamic Systems and Control</b> Must Complete Minimum of Two Courses Listed Below		
Course Number	Course Title	Taken
ME4731	Engineering Design Optimization	<input type="checkbox"/>
ME4811	Multivariable Control of Ship Systems	X
ME4812	Fluid Power Control	<input type="checkbox"/>
ME4821	Advanced Dynamics	X
ME4823	Dynamics of Marine Vehicles	X
ME4825	Marine Propulsion Control	<input type="checkbox"/>

<input type="checkbox"/> <b>System Design</b> Must Complete Minimum of Two Courses Listed Below		
Course Number	Course Title	Taken
TS4001	Integration of Naval Engineering Systems	<input type="checkbox"/>
TS4002	Ship Design Integration	<input type="checkbox"/>

<input type="checkbox"/> <b>Materials Science</b> Must Complete Minimum of Two Courses Listed Below		
Course Number	Course Title	Taken
MS4215	Phase Transformation	<input type="checkbox"/>
MS4312	Characterization of Advanced Materials	<input type="checkbox"/>
MS4811	Mechanical Behavior of Engineering Materials	<input type="checkbox"/>
MS4822	Engineering and Science of Composite Materials	<input type="checkbox"/>

<input type="checkbox"/> <b>Exception Track</b> Must Include a Minimum of Two Courses in a Specialization Track Approved by both the Department Chairman and Academic Associate		
Course Number	Course Title	Taken
		<input type="checkbox"/>
		<input type="checkbox"/>
		<input type="checkbox"/>
		<input type="checkbox"/>
		<input type="checkbox"/>
		<input type="checkbox"/>
		<input type="checkbox"/>

## MECHANICAL ENGINEERING DEPARTMENT STUDENT GUIDE

### 4. Course Credit Requirements:

The Master of Science degree in Mechanical Engineering requires at least 32-quarter hours of graduate level credits. At least 12-quarter hours must be at the 4000 level and at least 24 quarter hours must be in courses designated Mechanical Engineering. Identify courses to be counted toward the MSME degree:

***NOTE: NO COURSES COUNTED TOWARD A BSME EQUIVALENCY MAY BE COUNTED TOWARD MSME GRADUATION REQUIREMENTS***

A. List 4000 Level Courses applied toward MSME degree.

Course Number	Course Title	Quarter Hours
ME4811	Multivariable Control of Ship Systems	4
ME4821	Advanced Dynamics	4
ME4823	Dynamics of Marine Vehicles	4
Total 4000 Level Hours		<div style="text-align: center;"> <b>12</b>                      (12 required)                 </div>

B. List All 3000 and 4000 Mechanical Courses applied toward MSME. Include duplicates of Mechanical Engineering Courses listed above.

Course Number	Course Title	Quarter Hours
ME4811	Multivariable Control of Ship Systems	4
ME4821	Advanced Dynamics	4
ME4823	Dynamics of Marine Vehicles	4
ME3801	CLASSICAL CONTROL SYSTEMS	4
ME3611	MECHANICS OF SOLIDS	4
ME3521	MECHANICAL VIBRATIONS	4
Total Mechanical Engineering 3000 and 4000 level courses		<div style="text-align: center;"> <b>24</b>                      (24 required)                 </div>

## MECHANICAL ENGINEERING DEPARTMENT STUDENT GUIDE

C. List all 3000 and 4000 level courses applied toward MSME degree (Mechanical Engineering non-Mechanical Engineering graduate level courses):

Course Number	Course Title	Quarter Hours
ME4811	Multivariable Control of Ship Systems	4
ME4821	Advanced Dynamics	4
ME4823	Dynamics of Marine Vehicles	4
ME3801	CLASSICAL CONTROL SYSTEMS	4
ME3611	MECHANICS OF SOLIDS	4
ME3521	MECHANICAL VIBRATIONS	4
MA3132	PARTIAL DIFFERENTIAL EQUATIONS	4
MA3232	NUMERICAL ANALYSIS	4.5
Total ALL MSME degree 3000 and 4000 level courses		<div>32.5</div> <div>(32 required)</div>

### **8.6 Thesis Approval Form**

You need to have this form filled out at least one quarter before your first thesis slot. You need to have selected a specialization track, thesis area, electives, and a thesis advisor before you fill out this form. A good rule of thumb is during your third quarter or so. Remember that 4000 level courses are often offered only once a year.

**THESIS PROPOSAL APPROVAL FORM**

**You may submit this form at anytime, but it must be submitted one quarter before the first registration for ME 0810 (your thesis slot).**

Student Name: \_\_\_\_\_ Home Phone: \_\_\_\_\_

Curriculum: \_\_\_\_\_ Section: \_\_\_\_\_

Graduation Date: \_\_\_\_\_ Degree(s): \_\_\_\_\_

TENTATIVE THESIS TITLE: \_\_\_\_\_

Anticipated funding requirements (if any): \_\_\_\_\_

And source: \_\_\_\_\_

ELECTIVE COURSES TO BE TAKEN: \_\_\_\_\_

You must take at least six 4xxx courses to qualify for five ME 0810 slots.

FIRST QUARTER TO REGISTER ME 0810: \_\_\_\_\_

APPROVED BY:

Advisor (signature): \_\_\_\_\_ Date: \_\_\_\_\_

Advisor (name): \_\_\_\_\_

Curricular Officer: \_\_\_\_\_ Date: \_\_\_\_\_

Academic Associate: \_\_\_\_\_ Date: \_\_\_\_\_

Chairman: \_\_\_\_\_ Date: \_\_\_\_\_

Note to Student: This thesis form signifies a formal agreement between you and the faculty member. The information contained in this form is used for thesis accounting, faculty load planning, and research project management. When all approvals are completed, you, your thesis advisor, and the curricular office will receive a copy of this form.

PLEASE FILL OUT THIS FORM WITH YOUR THESIS ADVISOR AND RETURN TO THE  
ACADEMIC ASSOCIATE

### ***8.7 Graduating Student Exit Survey***

Remember to fill this form out when you graduate. Also remember to keep us informed of your progress during your career. You can do this by e-mail or by filling out the alumni feedback form in our web site at <http://www.nps.navy.mil/me/>.



# MECHANICAL ENGINEERING DEPARTMENT STUDENT GUIDE

## NPS MSME Degree Program Graduating Student Exit Survey

The ABET accredited MSME Degree Program you are now completing is designed to achieve the program outcomes listed below. Accreditation criteria require that we continually assess our progress in achieving the outcomes and provide the results of our assessment as feedback to the faculty for the purpose of improving the program. Please provide your assessment of the level of success for each program outcome.

5 = STRONGLY AGREE  
4 = AGREE  
3 = NO STRONG OPINION  
2 = DISAGREE  
1 = STRONGLY DISAGREE  
0 = NO COMMENT

### Program Outcomes

1. MSME degree recipients will demonstrate that they have also met the requirements for a BSME degree.

	5	4	3	2	1	0
(1) The requirement for BSME equivalence has been adequately explained to me.....	0	0	0	0	0	0
(2) I am confident that my study program has adequately prepared me for study at the advanced level.....	0	0	0	0	0	0
(3) My mathematics preparation adequately supported my study program.....	0	0	0	0	0	0
(4) I have a solid grasp of statistics.....	0	0	0	0	0	0
(5) My study program gave me the ability of apply knowledge of mathematics, science and engineering.....	0	0	0	0	0	0
(6) I understand the process of design.....	0	0	0	0	0	0
(7) I am able to identify, formulate and solve engineering problems.....	0	0	0	0	0	0

2. The MSME requires one year of study beyond the basic level.

	5	4	3	2	1	0
(8) The total credit hour requirements for my degree program were clearly communicated to me.....	0	0	0	0	0	0
(9) The course work requirements were made clear to me.....	0	0	0	0	0	0
(10) My study program provided an adequate foundation for advanced study.....	0	0	0	0	0	0
(11) My study program included courses outside of the traditional Mechanical Engineering discipline areas.....	0	0	0	0	0	0

3. Students seeking the MSME must demonstrate competence at the advanced level in one of the available disciplines of Mechanical Engineering. These disciplines are the thermal-fluid sciences; solid mechanics, shock and vibration; dynamic systems and control; system design; and materials science.

	5	4	3	2	1	0
(12) My study program enabled me to attain competence at an advanced level.....	0	0	0	0	0	0
(13) Sufficient advanced-level coursework was available in time to support my study program .....	0	0	0	0	0	0
(14) I made extensive use of the library in my study program .....	0	0	0	0	0	0
(15) I felt confident in the expertise of the faculty in the area of my advanced-level study program.....	0	0	0	0	0	0

4. A complete engineering project or thesis project demonstrating mastery at the advanced level is also required; the student must also demonstrate a high level of communication skills.

	5	4	3	2	1	0
(16) I was able to evaluate potential thesis topics in timely fashion and to make a good choice .....	0	0	0	0	0	0
(17) The process of the conduct of research and thesis preparation was made clear to me .....	0	0	0	0	0	0
(18) I achieved advanced-level competence in the discipline area of my thesis research .....	0	0	0	0	0	0
(19) My thesis is an original contribution to the scientific or technical literature.....	0	0	0	0	0	0
(20) I feel that my thesis research will be of benefit to the military.....	0	0	0	0	0	0
(21) My thesis project has prepared me to carry out further original research in my field.....	0	0	0	0	0	0
(22) I feel that my thesis presentation was clear and effective.....	0	0	0	0	0	0

# MECHANICAL ENGINEERING DEPARTMENT STUDENT GUIDE

**We ask your considered responses to the following additional questions:**

1. What changes would you recommend in the refresher and transition phase of the curriculum in order to strengthen student preparation for the MSME program?
2. What program improvements, if any, are needed to guarantee that students are able to attain competence at the advanced level in their MSME programs?
3. Of the courses in your study program, which were most important to your goals?
4. Please give your opinion of the thesis process and the value of your thesis experience.
5. Do you think the student-faculty interaction is good within Mechanical Engineering and did it contribute to or detract from your educational experience?

**Other Comments (attach additional sheets if necessary):**